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<tr><td colspan="2">PRE-APPEAL BRIEF REQUEST FOR REVIEW</td><td colspan="2">Docket Number (Optional):
P47C2-US</td></tr>
<tr><td rowspan="3"><u>CERTIFICATE OF E-FILING/TRANSMISSION/MAILING</u>
I hereby certify that this correspondence is being transmitted via the Office electronic filing system in accordance with 37 CFR 1.6(a)(4), facsimile transmitted to the USPTO at (571) 273-8300, or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on <u>April 29, 2009</u>.

<u>/Erin Cowles/</u>
Erin Cowles</td><td>Application Number:
10/692,174</td><td colspan="2">Filed:
October 23, 2003</td></tr>
<tr><td colspan="3">First Named Inventor:
Eldridge</td></tr>
<tr><td>Art Unit:
2839</td><td colspan="2">Examiner:
Neil Abrams</td></tr>
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Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).
Note: No more than five (5) pages may be provided.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest.
See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)

☒ attorney or agent of record.
Registration number: <u>55,561</u>

☒ attorney or agent acting under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34: <u>55,561</u>

<u>/William T. Ralston/</u>
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Typed or printed name

(801) 426-2118
Telephone number

April 29, 2009
Date

Note: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms I more than one signature is required, see below*.

☐ *Total of __ form(s) are submitted.

ARGUMENTS SUPPORTING PRE-APPEAL BRIEF REQUEST FOR REVIEW

In support of Applicants' Pre-Appeal Brief Request For Review of the final rejection in the Office Action dated January 29, 2009 (hereinafter the "Office Action") in the above-identified patent application, Applicants respectfully submit the following:

I. Background:

Claims 26, 33, 35, 36, 41, 42, 48, 73-85, 87, 89-92, 94, 97-99, 103-110 (of which claims 26 and 42 are independent) are currently pending and can be found in the Amendment submitted on December 8, 2008. All of the claims stand rejected as obvious over various combinations of references. Applicants request review of the rejections of independent claims 26 and 42 on the grounds that (1) the Examiner has clearly erred in failing to consider evidence of secondary considerations that render the present claims non-obvious, and (2) the Examiner has clearly erred in failing to present a prima facie case of obviousness.

The present claims are directed to various arrangements of a test apparatus for testing semiconductor dies. Independent claims 26 and 42 recite a test apparatus that comprises a plurality of microelectronic probes each comprising a tip, a base, and a body. The tip can make a temporary pressure based connection to a terminal of a semiconductor die during testing, while the body can flex and exert a counter force when the contact tip is pressed against the terminal. The tip comprises substantially a palladium cobalt alloy. As a non-limiting example, the claimed test apparatuses can be used in effecting temporary pressure connections to fine pitch microelectronic devices having terminals disposed at spacing of less than 5 mils (page 5, lines 9-20 of original specification). For example, a tip used to make temporary pressure connections to fine pitch microelectronics devices can have a width on the order 1 mil (page 11; Figure 2B) tapering to a very fine point where contact to the terminal is made (page 26, lines 6-11; Figure 3A). Another non-limiting example of a tip is a truncated pyramid having a square contact surface measuring a few tenths of a mil on a side (page 40, lines 21-34; Figure 8E). Applicants have discovered that palladium-cobalt alloy is a particularly beneficial composition for the tip (page 41, lines 8-12) in that the resulting contact tip is wear resistant, resistant to oxidation, and avoids the buildup of friction polymers (paragraphs 5-9 of Declaration of Rodney Martens, submitted December 8, 2008).

II. Argument:

Independent claims 26 and 42 stand rejected as obvious over Fjelstad (US 5,632,631) in view of one or more of Cowie (US 5,236,789), Biberbach (DE 2753654), Shida (US 3,648,355), Yanof (US 5,513,430), and/or Feussner (US 2,123,330). Some dependent claims are also rejected as obvious over Faraci (US 5,810,609) in view of one or more of the above references.

Examiner Failed to Consider Evidence of Secondary Considerations

Without admitting that the Examiner has presented a prima facie case of obviousness, Applicants submit that the Examiner has erred in failing to consider evidence of secondary considerations previously submitted by Applicants in the form of a declaration by expert Dr. Rodney Martens submitted on July 7, 2008 (hereinafter the "Declaration"). In the declaration, Dr. Martens describes the difficulties in finding a suitable material for use in the tip of a microelectronic probe. The performance of a tip material over hundreds of thousands of contacts with bond pads of semiconductor dies can be unpredictable (Declaration, paragraph 5). In contrast to macro-scale electrical contacts (e.g., contacts such as in Cowie, Shida, Biberbach, and Feussner) microelectronic probes have very small contact areas. Materials suitable for use in larger contacts were found by Applicants to have various problems. For example, nickel-cobalt was found to become quickly contaminated with material from the bond pads resulting in increased contact resistance (Declaration, paragraph 6). Cobalt was found to have a tendency to migrate to the surface of the contact tip and form an insulating oxide layer (Declaration, paragraph 7). Palladium (e.g. as in Fjelstad and Yanof) was found to form electrically resistive frictional polymers (Declaration, paragraph 9). From the foregoing, a person of ordinary skill in the art would not believe that palladium would be a suitable material for a microelectronic probe tip, or that cobalt would be a useful alloy material (Declaration, paragraphs 9 and 11).

It is well known that the chemical arts are unpredictable. None of the cited references provides any teachings that would suggest that the addition of cobalt to palladium would form an alloy that is harder and more wear resistance than palladium. Nor do any of the cited references provide any teaching that would suggest that the addition of cobalt to palladium would reduce the formation of frictional polymers. Furthermore, none of the cited references provides any teachings that the use of cobalt in a palladium cobalt alloy would not suffer similar oxidation problems as when cobalt is used in other alloys. Surprisingly, Applicants discovered that

palladium cobalt provides unexpected performance when used as a microelectronic probe tip in that required hardness (and thus wear resistance), low material transfer, and low electrical contact resistance are obtained.

The Examiner failed to consider any of the above evidence, and the Examiner has not provided any substantive analysis weighing the teachings of the prior art and the evidence of secondary considerations provided by Applicants. Accordingly, the rejection for obviousness is in clear error for at least the above reasons.

Examiner Fails to Present a Prima Facie Case of Obviousness

Notwithstanding the above, Applicants also traverse the rejections on the grounds that the Examiner has failed to present a prima facie case of obviousness.

As noted above, the Examiner admits that Fjelstad fails to disclose a microelectronic probe comprising a tip of palladium cobalt. Fjelstad makes mention of "gold, osmium, rhenium, platinum, palladium and alloys and combinations thereof" (col. 3, lines 60-62) and "gold, silver, platinum, palladium, osmium, rhenium and combinations thereof" (col. 28-30). Fjelstad describes that such materials are preferred as being etch-resistant for forming sharp edges, and in particular recommends the use of osmium and rhenium (col. 8, lines 30-34). Fjelstad therefore provides nothing that would lead a person of ordinary skill in the art to consider palladium cobalt for a tip structure.

Nor would any of the other cited references suggest using a palladium cobalt tip for a microelectronic probe tip as alleged by the Examiner, as the cited references describe the use of palladium alloys in different environments that are largely inapplicable to the presently claimed arrangement of a microelectronic probe.

For example, Cowie describes a large-scale electrical connector suitable designed for use in a harsh environment such as under the hood of an automobile (col. 1, line 24-29; Figure). While Cowie mentions use of a relay switch in telecommunications (col. 1, line 30-31), Cowie fails to disclose any corresponding structure or disclose how his palladium alloys would be applied to such a structure. Cowie's electrical connector comprises an insertion plug (16) which is coated with a palladium alloy (2) that is inserted into a socket (10) which includes a palladium alloy inlay (14). Accordingly, Cowie's connector operates in a different environment using different principles than that of the present invention. In particular, Cowie's connector is

designed for contact between surfaces of similar chemical composition: both the plug and the socket appear to use the same palladium alloy. Further, Cowie's connector requires sliding his plug into the socket, which would produce substantial sliding of the plug coating across the socket inlay. Cowie's palladium alloy coating and inlay are therefore subjected to distinctly different conditions than that of a microelectronic probe tip as in the present invention. In contrast to Cowie, microelectronic probe tips can contact chemically different materials, such as the aluminum bond pad of a semiconductor die. Furthermore, a probe tip presents a much smaller contact area, and little (or no) sliding may be produced when contacting the probe tip to a terminal as compared to the connector of Cowie. Accordingly, a person of ordinary skill in the art would have no reason to believe that materials that are suitable for use in Cowie's application would have acceptable performance for a microelectronic probe. Further, while Cowie describes various palladium alloys, and even mentions palladium cobalt alloys, Cowie teaches that other alloys are preferred in his application, such as palladium aluminum and palladium silicon (col. 3, lines 32-36). Therefore, a person of ordinary skill in the art would not be led by Cowie to consider use of palladium cobalt for a microelectronic probe tip.

Biberbach is also inapplicable to selection of materials for use in a microelectronic probe tip. Biderbach teaches the use of palladium cobalt for an electrical contact which is a "sliding contact" and subjected to "heavy mechanical loads." Accordingly, Biberbach is inapplicable to microelectronic probes, which may have little (or no) sliding and operate with relatively light loads. Further, Biberbach fails to disclose any particular structural arrangements of palladium cobalt in a contact that would be analogous to a microelectronic probe. Therefore, a person of ordinary skill in the art would not be led by Biberbach to consider use of palladium cobalt for a microelectronic probe tip.

Shida describes the use of palladium alloys in a sheet form (col. 1, lines 60-65; Figure 1). Shida therefore provides no reason to believe that a palladium alloy would perform well when used as a probe tip. Further, Shida discloses that his palladium alloy is selected for use in protecting from sulfurization and oxidation (col. 1, lines 66-69), and is silent with respect to hardness or wear resistance. Therefore, a person of ordinary skill in the art would not be led by Shida to consider use of palladium cobalt for a microelectronic probe tip.

Yanof describes only the use of palladium (col. 5, lines 37-43) and fails to suggest use of any palladium alloys or in particular use of palladium cobalt. Therefore, a person of ordinary

skill in the art would not be led by Yanof to consider use of palladium cobalt for a microelectronic probe tip.

Feussner, while describing various palladium alloys in electrical contacts, fails to disclose any particular arrangements that would appear applicable to a microelectronic probe. Accordingly, a person of ordinary skill in the art would not be led by Feussner to consider use of palladium cobalt for a microelectronic probe tip.

Faraci (relied on only for some dependent claims) makes no mention of palladium cobalt at all, describing an electrical contacts made of copper with a gold plating or alternately "nickel, gold, hard gold, titation and combinations and alloys thereof "(col. 7, lines 52-57). Accordingly, a person of ordinary skill in the art would not be led by Faraci to consider use of palladium cobalt for a microelectronic probe tip.

Accordingly, none of Cowie, Biberbach, Shida, Yanof, Feussner, or Faraci discloses or suggests that palladium cobalt would be suitable for use in a microelectronic contact. Even when viewed as a whole, the cited references would not lead a person of ordinary skill in the art to use of palladium cobalt for the tip of a microelectronic contact. The types of contacts and environments of Cowie, Biberbach, Shida, Yanof, and Feussner are different from that of the present invention, the references being directed generally to large-scale connectors rather than small microelectronic probes. Performance of large connectors (which typically include similar materials on both contacts) is distinctly different from performance of small microelectronic probes (especially when contacting a dissimilar material).

Further, as noted above and supported by the Dr. Rodney Martens declaration, a person of ordinary skill in the art would not have a reasonable expectation of success in using palladium cobalt for the tip of a microelectronic contact. As a person of ordinary skill in the art would have no reason to make the modifications and/or combinations proposed by the Examiner, and would have no reasonable expectation of success, the rejection fails to present a prima facie case of obviousness and should be withdrawn.

III. Conclusion:

In view of the foregoing, Applicants respectfully submit that the rejection of all of the claims should be withdrawn and all claims allowed.